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PERSPECTIVE -- SELF RELIANCE IN DEFENCE AEROSPACE INDUSTRY: MAKE IN INDIA; MAKE FOR WORLD

Introduction

- Recently, Prime Minister Narendra Modi laid the foundation stone of the **C-295 transport aircraft manufacturing facility in Vadodara**.
- The facility will manufacture **C-295 aircraft for the Indian Air Force (IAF)** through collaboration between Tata Advanced Systems Limited, Airbus Defence and Space S.A., Spain.
- The facility, which will manufacture C-295 military transport planes, will give a major fillip to the country's Defence Industrial Complex. With this, **India is now set to be included in the group of just a few countries that can make this aircraft.**

C295 Production and the recent Agreement with India

- The C295 was originally produced by a Spanish aircraft manufacturer, Construcciones Aeronauticas SA. This company is now part of Airbus and the aircraft's manufacturing takes place at Airbus's plant in Spain.
- In September 2021, India signed a Rs 21,935 crore deal with Airbus Defence and Space to procure 56 C295 aircrafts.
- These transport aircrafts with contemporary technology will replace the ageing Avro-748 planes of IAF, which entered service in the 1960s.
- 16 C295 aircrafts will be delivered between September 2023 and August 2025. **The remaining 40 will be manufactured at the Vadodara manufacturing facility.** The first Made in India aircraft is expected in September 2026.
- After the completion of the delivery of 56 aircraft to IAF, Airbus Defence & Space **will be allowed to sell the aircraft manufactured in India to civil operators and export to other countries as well.**



Technical specifications of the C295 Aircraft

- The C295 is a new-generation tactical airlifter in the light and medium segment.
- The C295MW is a transport aircraft with a **5 to 10-tonne capacity and a maximum speed of 480 kmph.**
- It has a **rear ramp door for quick reaction and para-dropping of troops and cargo.**
- **Short take-off and landing from semi-prepared surfaces** are some other features.
- This aircraft has the longest unobstructed cabin in its class which can accommodate 71 seats. C295 can carry more cargo than its competitors with direct off-loading through the rear ramp.

Roles that the C295 can perform

- As a tactical transport aircraft, the **C295 can carry troops and logistical supplies from main airfields to forward operating airfields of the country.**
- It can also **operate on short unprepared airstrips as it is capable of Short Take-off and Landing (STOL).**
- It can operate from short airstrips just 2,200 feet long and can fly low-level operations for tactical missions flying at a low speed of 110 knots.
- The aircraft **can be used for casualty or medical evacuation, performing special missions, disaster response and maritime patrol duties.**
- The C295 conducts multi-role operations worldwide under all weather conditions. It is fully certified and routinely operates day and night in combat missions in all weather extremes, from desert to maritime environments, from extremely hot to extremely cold temperatures.

In which terrains have the C295 operated across the world?

- As per Airbus, the C295 operates in the Brazilian jungles and Columbian mountains in South America, the deserts of Algeria and Jordan in the middle east and the cold climates of Poland and Finland in Europe. The aircraft has also flown in military operations in Chad, Iraq and Afghanistan.

How will the C-295 aircraft boost India's Defence Industry?

- The C295 programme, **in partnership with the trusted Tata Group, is strongly aligned with the Government of India's vision of an 'Atmanirbhar Bharat (self-reliant India).**
- It is the **first 'Make in India' aerospace programme in the private sector,** involving the development of a complete industrial ecosystem-from manufacture to assembly, test and qualification, to delivery and maintenance of the complete lifecycle of the aircraft.
- This will be the first time in the Indian private sector that an aircraft will be manufactured in-country from parts to final assembly. The Programme will lead to the development of a strong private industrial aerospace ecosystem in India and **will create more than 15,000 skilled direct and indirect jobs across the aerospace ecosystem,** and over 125 suppliers qualified on global quality standards across India.
- The C-295 aircraft **will be manufactured outside of Europe for the first time** and it is a major boost to 'Make in India' and domestic aviation manufacturing. With this, India will enter an illustrious league of about a dozen nations with the capacity to manufacture military transport aircraft.
- This project offers a unique opportunity for the Indian private sector to enter the technology-intensive and highly competitive aviation industry. It will augment domestic aviation manufacturing resulting in **reduced import dependence and an expected increase in exports.**

Need for Self-Reliance in Military Aerospace Industry

- Indigenised defence production is a significant factor that provides **strategic independence to a nation,** thereby exponentially increasing national security. Recent wars that have occurred in the world have amply indicated that the **21st century belongs to aerospace power** which is normally characterised by speed of response, adaptability to changing situations, long reach, precision-targeting capabilities to minimise collateral damage and resources to transport all forms of national power, wherever and whenever required.
- The **volatile geo-political and security situation in the region,** combined with India's aspirations to become a regional power with a global reach, has made it imperative to possess all-encompassing military wherewithal, **especially in the aerospace sector.**
- The capability should preferably be made within the country, as the **problems associated with dependency on foreign sources have been made harshly evident after the disintegration of the USSR.**

Measures taken

- Since the 1990s, the Government of India (GoI) has emphasized the indigenisation of the defence industry with several measures initiated in this direction.
- The **promulgation of the Defence Procurement Procedure (DPP),** opening the market to the private sector and **permitting Foreign Direct Investment (FDI)** are some of the policies that have been formulated.

MUST READ: (Steps that are being taken by the Government)

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- **But actualising procurement decisions into manufacturing have been relatively slow.** As Air Marshal Vinod Patney (Retd), Director General, Centre for Air Power Studies, at a Seminar on **'Energising Indian Aerospace Industry'** recently mentioned,

“The silver lining is discernible, but barely.” An attempt, therefore, is being made to review the current status and trajectory of indigenisation in the aerospace industry.

What has been ailing the Indian Military Aerospace Industry?

Expensive and Complex Aerospace Technologies

- Defence technologies and more so aerospace technologies, are very complex and expensive to develop and integrate. It consists of a number of hard and soft elements. The hard elements consist of materials used, design documents, manufacturing/assembly infrastructure and other such items. The soft elements include human skills, attitude to absorb knowledge, teamwork to handle new equipment, leadership and management processes. This package of the hard and soft elements is a part of aerospace manufacturing ‘technology’. India doesn’t produce an aero-engine for any of its design programmes.

Absence of Industry

- Absence of a technologically advanced and internationally competitive industry greatly impacted India’s efforts in the aerospace sector. Thus, the demand and consequent dependence on foreign supplies have continued too.

Import Dependency

- Though we have acquired substantial military manufacturing capability in the aero sector through technology transfer, we are still critically dependent on imports for aircraft and their propulsion, sensors and weapon systems, with weak synergy between the design agencies and production houses, and in terms of design capability of fighters and transport aircraft and engines.

Inadequate Privatisation

- Inadequate privatisation has been a significant cause of the stagnation of the aerospace industry. The public sector may have developed medium and small entrepreneurs, but only as tier-3 and tier-4 suppliers and not developed many or any as tier-1 or tier-2 suppliers. As a result, the capacity of the local industry for production is limited to just about 25 per cent of the demand.

Bureaucratic Hurdles

- Skewed decision-making process, bureaucratic red tape and multiple decision-making heads led to slow growth of India’s Defence Aerospace Industry.

Production and time delays

- Indigenous defence production has been wrought with production delays. For example, India's first indigenously produced Light Combat Aircraft, HAL Tejas, faced a long production delay with HAL requiring a total of seven years to produce 16 aircrafts despite the estimated timeline of four years.

Budgetary issues

- A lack of capital expenditure on domestic defence production, and research and development has been a major obstacle to India's self-reliance goals. While India's defence budget has increased over the years, a major chunk is spent on personnel costs such as salaries and pensions, thereby shrinking the funds available for defence production.¹⁵ For instance, of the total defence budget for 2020-2021, 58.6% is allocated for salaries and pensions, whereas only 22.7% has been allocated for capital outlay.
- Further, India's budget allocation for research and development is only 4% of the total defence budget for 2020-2021. This is much lower compared to capital expenditure by technologically advanced countries like the USA and China, which spend 12% and 20% of their defence budgets on research and development, respectively.

Government's reluctance to grant defence contracts to India's private sector

- For instance, so far, the only major contract granted to India's private sector is the INR 4,500 crore deal with Larsen & Turbo to supply specific artillery systems. As a result, India continues to rely on imports, thereby hindering the development of the indigenous industry.

Stuck in the comfort zone: Transfer of Technology (ToT)

- The Indian aerospace industry has been stuck in the comfort zone of 'licenced production', with the bureaucracy supporting it with the insistence of a clause of Transfer of Technology (ToT) in almost every contract. ToT as it exists today, offers only modern production techniques but does not help in obtaining modern technology to assist in design and development as the Intellectual Property Rights continue to remain with the original equipment manufacturer. There is, therefore, a need for a change in policy to arrive at correct assessments and decisions across the spectrum of political leaders, bureaucrats and technocrats.

Public Sector Inefficiencies

- Hindustan Aeronautics Limited (HAL) is more than eight decades old now. HAL failed to build on that notable success and progress to more complex designs.

What had the First Defence Policy envisaged?

- Let's go back into history, to the rationale that existed when laying down the First Industrial Policy of 1948. This Policy was accorded the status of statutory legislation by the Industries (Development and Regulation) Act of 1951. It was visualised that **since the defence industry was critical to national security, the country needs to be self-reliant in this sector.**
- It was also stated that the industry must remain under complete control of the government, as it requires heavy investment, which only the government can provide. Accordingly, the Gol invested heavily in setting up the massive empire of DPSUs and DRDO. The capacities of these DPSUs match the biggest, and best of the world but the **output has been abysmally low.**

In 1956, the Industrial Policy Resolution passed by the Indian Parliament rendered the defence manufacturing sector the exclusive domain of defence PSUs and ordnance factories. However, it was only in 2001, that it allowed the private sector to participate 100 per cent in defence manufacturing, capping Foreign Direct Investment (FDI) at 26 per cent. However, 26 per cent of FDI did not encourage any major OEM to start manufacturing in India. In 2006, an offset policy was announced to leverage India's princely acquisition to get outsourcing, export orders and critical technology from major global defence manufacturers. The FDI limit was raised to 49 per cent in 2015. In 2020 it was further raised to 74 per cent under the automatic route and up to 100 per cent through the government route in the defence sector. but technological progress in pursuit of Atmanirbhar has remained dismal.

The Way Ahead

Reworking Command Structure

- Replacing generalist bureaucrats with professional military talent and/or technocrats could be an option.
- India needs legislation promulgated through an Act of Parliament, **on the lines of the Goldwater-Nichols Act of the USA** or other similar decrees that have transformed militaries and defence ministries in various nations across the world.

Note: Goldwater-Nichols Act made the most sweeping changes to the United States Department of Defense by reworking the command structure of the U.S. military.

Reinventing DPSUs

- A complete review of the functioning and capabilities of DRDO, DPSUs and OFs is necessary. The review should specify the development of technology/product either through joint ventures, exclusively indigenous or with a foreign partner. Such an exercise would cut out the podginess that some of these organisations carry and would make them accountable to the nation for their non-performance.

Budget for Research and Development

- Budget for R&D as investments in this sector are woefully inadequate. The investments should be concurrent with a technology roadmap, specifying timelines. A globally competitive aerospace industry will be possible only if the nation invests in R&D.
- For a long time, the nation's R&D as a percentage of GDP has been less than one per cent. There is a need to increase investments in R&D to at least two per cent of GDP for India to innovate in aerospace to the extent that it approaches the leading edge of technology.

Level Playing Field to Private Sector

- The private industry has always been complaining of not being provided with a level playing field vis-à-vis the DPSUs. It expects a steady stream of orders and a well-defined production and export policy, with no ambiguities or conjectures. A concerted effort is needed in this direction on the part of the GoI. In addition, the DPSUs need to consider the private industry more as an equal rather than an opponent.

Incentivising Exports

- The key drivers for the globalisation of the aerospace industry are growth through new geographies and increasing competitiveness as home market demands can tend to be insufficient or stagnate. The exports, therefore, need to be incentivised.

Multidirectional Efforts

- The aerospace industry needs to work on multiple fronts to achieve success. It needs to develop a strong supplier system, innovate/develop new technologies and acquire expertise by absorption of high-end technology through partnerships with foreign manufacturers.
- One key factor for the success of such alignments would be the commitment of the GoI in terms of volumes and timelines for procurements.
- Disaggregated manufacturing, creating clusters and exports are just three of the many strategies that need to be followed to initiate indigenous manufacture in the aerospace sector.

Equitable sharing of resources

- National resources need to be integrated through collaboration rather than competition between government organisations, DPSUS/ OFs/ DRDO and the private sector through Public-Private-Partnership (PPP).

National Aerospace Policy

- A National Aerospace Policy has to be formulated and a Department of Aerospace put in place, both to be guided by a long overdue National Aerospace Commission.

Regular interaction at the policy-making level

- The GoI should ensure an effective institutionalised interface between the Ministry of Defence, the Armed Forces and the private sector for regular interaction at the policy-making level.

Fiscal Incentives

- There are fiscal incentives for other industries, but none for the defence industry. The GoI should grant 'Industry' status to the aerospace sector and 'Infrastructure Industry' status to the defence industry along with tax incentives.

Prudent Taxation Policy

- A prudent taxation policy for the private sector is the need of the hour. The taxes are 41 per cent higher if made in India! The private sector should be on par with DPSUs and foreign suppliers.

Privatize Labs

- The DRDO currently operates 51 laboratories. It is time to start privatising some of these so that their efficiency and productivity can be brought to acceptable levels and budgeted R&D funds utilised maximally.

Nurture Start-Ups and imbibe Global Best Practices

- Innovation, the impelling force behind progress, would come from a nourishing startup ecosystem which India has. Collaboration with Global Industry will help the Indian industry to imbibe global best practices – an essential step towards becoming an acknowledged aerospace power.

Zero-defect philosophy

- Competing globally would require the nation's aerospace and defence workforce to achieve the prescribed skills and certifications. There is a need to stress zero-defect philosophy, quality conscious attitude and a constant endeavour to move up the value chain from components to Shop-Replaceable Units to Line-Replaceable Units to Sub-systems.

Other

- Production capacity, technology capability, an inshore supply chain and workforce training need to be built up through FDI.

Wrapping Up

In 1993, Dr Abdul Kalam, the then Scientific Adviser to the Defence Minister, headed a committee that underscored the need to improve India's self-reliance quotient from 30 per cent in 1992 to 70 per cent by 2005. He had identified critical areas such as the focal plane array, passive seekers, stealth, AESA radar, Ring laser gyroscope and carbon fibres but we are still far from that target. PSUs have achieved good standards in the integration of imported assemblies and sub-assemblies, but have not progressed much beyond that in most spheres.

One major impediment is the apprehension about intellectual property rights in aerospace and defence in India. As a result, there has been no aerospace R&D by Indian private companies while R&D by the public sector has been mediocre. **Clarity in enunciating policies** should be one step.

There are no easy shortcuts to filling up capability gaps in the design and manufacturing of aircraft and their systems. In an oligarchic market, with a handful of design houses, and IPR hiccups, governmental policy and mentoring would be critical for fostering joint technology partnerships, joint ventures in manufacturing and public-public and public-private partnerships. All stakeholders, including the private sector, must upscale their R&D allocation substantially as technology transfer of key systems will be hard to come by. The Indian industry must rise in a globally networked environment. The best way forward is to have a clear vision to upscale our technological skills to achieve self-reliance or Aatmanirbharta.

<https://sansadtv.nic.in/episode/perspective-make-in-india-make-for-world-31-october-2022>

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